The unique hole placement scheme described herein provides a number of advantages over the prior art. In particular, a ring that has 2×3 symmetry substantially simplifies the manufacturing process and the fixator construction process. With 2×3 symmetrical rings, one ring can serve as either the upper ring or the lower ring. As a result, a manufacturer need only make half as many ring designs for a system. In addition, if a surgeons using the device want to attach additional rings to the base Taylor Spatial Frame™ fixator, they need not overly concern themselves with having the proper ring, nor the proper orientation of the ring.

Key advantages also result from having a defined relationships between the various holes on a plate, and a defined relationship between various holes on different plates. In general, this facilitates the use of mathematical methods to analyze a fixation system, and determine the proper mode for correcting a deformity. From a clinical standpoint, it gives a surgeon a great deal of flexibility and aids in preoperative planning and surgical application of the device. For example, in cases of sever deformities the various bone fragments are completely out of alignment. In such cases it is difficult for a surgeon to place various plates with the same orientation on the various fragments. With the current invention, a surgeon when attaching the device can place reference wires at the same predetermined anatomical position on each unaligned bone fragment. Once the surgeon determines the appropriate positioning of the first plate on the first bone fragment, the first plate is secured to the reference wire. Subsequent plates can then be easily positioned on the remaining bone fragments. A surgeon would attached the subsequent plates to the reference wires on the remaining fragments using the accessory holes at the same locations used with the first plate. The various plates would then be aligned after the correction is made. Such strategic placement of plates relative to one another facilitates the use of the unique method of using the Taylor Spatial FRAME™ fixator. Moreover, this provides an easy gauge during the course of the correction that allows the surgeon to judge if the correction is accurate or needs adjustment. Indeed, if the plate holes are not moving into alignment, the surgeon knows that an adjustment is needed. Furthermore, once the plates have returned to their neutral positions, with the holes in the upper and lower plates are perfectly aligned, and a surgeon can simply insert horizontal rods. Such rods could provide accessory stabilization if required.

We claim:

1. An orthopaedic spatial fixation system for holding bone parts comprising a plurality of fixation plates wherein each plate includes a body portion having n holes positioned therein, whereby said holes are substantially positioned along an arc of α° of a circle defined by a diameter d, and the cord length between adjacent holes is substantial equal to l, and

$$d = l\left(\sqrt{\frac{1}{\tan^2\left(\frac{\alpha}{2n}\right)}+1}\right).$$

and whereby the diameter d for each plate within the system is unique, and the value for n(360/α) for each consecutive plate diameter d in the system is a multiple of 3.

2. The orthopaedic spatial fixation system ot claim 1 further comprising bone pins for interfacing the bone parts and plates; and,

a plurality of struts that extend between the plates to hold the plates in a selected position relative to one another and relative to the bone parts;

wherein the struts are attached to the plates at the holes; and,

wherein a plurality of the struts have adjustable length sections for varying the length of the strut to adjust the relative position of the plates.

3. The orthopaedic spatial fixation system of claim 2 wherein the holes on at least one of the plates are one hundred twenty degrees (120°) apart.

4. The orthopaedic spatial fixation system of claim 1 wherein rotation of one plate one hundred twenty degrees (120°) relative to an adjacent plate results in the same alignment of adjacent holes as before such rotation of the plates.

5. The orthopaedic spatial fixation system of claim 1 wherein the plates are symmetrically configured so that if one plate is placed over an adjacent plate, the holes in each plate can be aligned.

6. The orthopaedic spatial fixation system of claim 5 wherein the plates are symmetrically configured so that one plate can be flipped over without affecting the alignment of adjacent holes.

7. The orthopaedic spatial fixation system of claim 2 wherein there are two plates and each plate includes 3 holes.

8. The ortopaedic spatial fixation system of claim 7 wherein

there are six struts each having a first end and a second end;

the first end of each strut is attached to one of the plates and the second end of each strut is attached to the other plate;

the ends of the struts are attached to the plates at the holes; and, each hole accommodates two strut ends, one from each of two adjacent struts.

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